

**To:** Vandenberg, John[vandenberg.john@epa.gov]  
**Cc:** Ross, Mary[Ross.Mary@epa.gov]  
**From:** Flowers, Lynn  
**Sent:** Thur 8/13/2015 12:45:21 PM  
**Subject:** FW: Two more points to consider

Lynn Flowers, PhD, DABT

Associate Director for Health

National Center for Environmental Assessment

US EPA

Washington, DC

703-347-8537

**From:** Flowers, Lynn  
**Sent:** Wednesday, August 12, 2015 6:07 PM  
**To:** Kavlock, Robert  
**Cc:** Burke, Thomas; Koglin, Eric; Sayles, Gregory; Garrahan, Kevin; Olden, Kenneth; Ross, Mary; Phillips, Linda  
**Subject:** Re: Two more points to consider

Two things that I know of for sure are site-specific arsenic information and chromium speciation. That info isn't there and not obvious what to assume. Not sure if there is other info needed. We don't have their equations either but could assume standard. They didn't always include units but you could probably guess. I am sure they used a spreadsheet and did it fast!! The author is a well-respected risk assessor.

Lynn

Sent from my iPhone

On Aug 12, 2015, at 5:54 PM, Kavlock, Robert <[Kavlock.Robert@epa.gov](mailto:Kavlock.Robert@epa.gov)> wrote:

What info are you lacking to replicate?

On Aug 12, 2015, at 5:53 PM, Flowers, Lynn <[Flowers.Lynn@epa.gov](mailto:Flowers.Lynn@epa.gov)> wrote:

We could not duplicate the R8 oral screening levels because we don't have enough information. Also, the screening levels are based on noncancer effects. Several of the metals could also be carcinogenic and some (arsenic) have the in utero twist to think about. Short term exposures and cancer risks are of course tricky to consider. Just pointing it out.

Lynn

Sent from my iPhone

On Aug 12, 2015, at 5:07 PM, Burke, Thomas <[Burke.Thomas@epa.gov](mailto:Burke.Thomas@epa.gov)> wrote:

Very good work. Thanks!

Tom

Thomas A. Burke, PhD, MPH

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On Aug 12, 2015, at 4:20 PM, Flowers, Lynn <[Flowers.Lynn@epa.gov](mailto:Flowers.Lynn@epa.gov)> wrote:

Hello all:

Linda Phillips did some calculations to estimate screening levels based on dermal exposure to sediments and water for children and adults to compare to the screening levels for oral exposure.

**Bottom line: Most dermal screening levels were orders of magnitude above the oral screening levels that R8 calculated.**

**POSSIBLE exceptions are arsenic and chromium VI. The numbers came out lower, but we would need more information from R8 regarding site-specific information on arsenic bioavailability and on how speciation of chromium was handled.**

More details:

The analysis used the same toxicity values, assumptions for exposure frequency and duration, and body weights as Region 8.

RAGS Dermal Guidance and the Exposure Factors Handbook were used for soil adherence, surface area recommendations, permeability coefficients and absorption factors, where available. An assumption of contact over 2 hours/event was made (no guidance on this).

Values for contact with sediment for only 2 of the inorganics on the list were calculated because they were the only 2 with dermal absorption fractions available in the Dermal Guidance.

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**From:** Koglin, Eric  
**Sent:** Wednesday, August 12, 2015 9:05 AM  
**To:** Flowers, Lynn; Cogliano, Vincent; Shannon, Teresa  
**Cc:** Sayles, Gregory; Garrahan, Kevin; Olden, Kenneth; Ross, Mary  
**Subject:** RE: Screening levels for recreational receptors at the Gold King Mine Site

Lynn

Great!

Thanks for stepping up so quickly. Kevin should be at the ORD Desk in the EOC. He can be reached at 202-250-8924. He is also monitoring his email.

Regards,

Eric

**From:** Flowers, Lynn  
**Sent:** Wednesday, August 12, 2015 5:11 AM  
**To:** Koglin, Eric; Cogliano, Vincent; Shannon, Teresa  
**Cc:** Sayles, Gregory; Garrahan, Kevin; Olden, Kenneth; Ross, Mary  
**Subject:** RE: Screening levels for recreational receptors at the Gold King Mine Site

Eric et al:

• I looked through the screening level information for the inorganics that have been found in the spill and nothing jumps out as incorrect. However, there doesn't appear to be a dermal component for exposure to the surface water, which one would encounter on the way to the sediment and perhaps to get the water to drink. The write up is silent on that issue and should probably mention that it is missing, and how much of an impact it might have on the screening levels...or else include dermal exposure in the calculations.

•□□□□□□□ Otherwise, this is a pretty conservative analysis with a hiker/camper actually drinking the water as a sole source on a daily basis (2 liters/day) for 64 days, and ingesting some of the sediment (100 mg/day) for that same time period.

•□□□□□□□ Depending on who is going to be using this information, I would recommend that the equations for deriving the screening levels for soil and water be added. It just strikes me as missing, primarily for the sake of transparency and for anyone who would want to reproduce the numbers.

•□□□□□□□ In reality, this analysis (with the exception of the dermal component) is pretty close to what you would also do if the water were a source of water for drinking/showering/bathing for the surrounding communities (as the hiker/camper is using the water as sole source drinking water). Including the normal showering component for inhalation probably would NOT change the screening levels much, because the inorganics are largely not volatile. Again, I am not sure about the dermal exposure and how much that would contribute.

•□□□□□□□ It might not be a bad idea to include how these screening levels might align with the “community drinking water scenario” in the write up—assuming Region 8 would agree! Again, just an observation and potential suggestion for them.

We have a couple of folks here who could double-check the input parameters, toxicity values and final screening levels if you would like a second set of eyes on the details.  
And also think more (than I know) about the dermal issue.

I will call Kevin now.

Lynn

Lynn Flowers, PhD, DABT

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**From:** Koglin, Eric

**Sent:** Tuesday, August 11, 2015 7:36 PM

**To:** Flowers, Lynn; Cogliano, Vincent; Shannon, Teresa

**Cc:** Sayles, Gregory; Garrahan, Kevin; Olden, Kenneth; Ross, Mary

**Subject:** Screening levels for recreational receptors at the Gold King Mine Site

All

I'm helping to coordinate ORD's reachback support to the Gold King Mine release. The Regions are pulling together a lot of data and information. The attached is a draft document developed by Region 8 that provides screening levels that they want to use for recreational receptors for the Animas and San Juan River users.

I would appreciate it if you could take a quick look at the information in the attached to see if anything jumps out at you. ORD did not receive this document until after review comments were due at 1900 EST today, but I think it's important for our ORD experts to take a look just in case something was missed.

Hopefully you'll be able to find a few minutes to look this over first thing in your morning or if you think there is someone else that should be contacted.

Please contact Kevin Garrahan at 202-250-8924 (ORD Desk in the EOC) or me as soon as you can tomorrow.

I apologize for the rush.

Eric

Eric Koglin

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